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May 12, 2010

Via Electronic Filing
Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Ex Parte Notice
WT Docket No. 07-293
IB Docket No. 95-91

Dear Ms. Dortch:

On May 10, 2010, Ron Olexa and the undersigned, both representing Horizon Wi-Com, LLC, met with Messrs. Ronald Repasi, Patrick Forster and Robert Weller, all of the Commission's Office of Engineering and Technology. Questions were raised regarding certain matters. The enclosed submission responds to those questions. In addition, the enclosed copy of an *ex parte* filing of August 4, 2009 and of this date from the WCS Coalition added further responsive information.

Pursuant to 47 C.F.R. § 1.1206(b)(2), this notice is being submitted electronically in the above-referenced docket. In addition, one copy of this notice is being transmitted via e-mail to Messrs. Repasi, Forster and Weller.

Very truly yours,

/s/ Thomas Gutierrez
Counsel for Horizon Wi-Com, LLC

Enclosures

cc: R. Repasi
P. Forster
R. Weller

The FCC Should Reject Sirius XM's Proposal To Restrict Mobile Transmissions to Every Other TDD Frame

In its response to the staff's *Technical Public Notice*, Sirius XM suggests, albeit merely in a footnote, that the Commission modify the proposed rules to bar WCS mobile devices from transmitting during every other Time Division Duplex ("TDD") frame.[1] In support of this proposal, Sirius XM mischaracterizes a statement made by the WCS Coalition in an August 4, 2009 filing to suggest that such a restriction would be consistent with current technology. To be clear, Sirius XM's proposal is not supported by any broadband standard, cannot be realized with currently available equipment, likely would not be supported by vendors, and if adopted would effectively preclude broadband offerings in the WCS band.

In the WCS Coalition's August 4, 2009 filing, the Coalition took issue with the manner in which Sirius XM conducted certain testing in Ashburn, VA because Sirius XM did not realistically replicate the cycle of base station transmissions, guard time, mobile transmissions, and guard time that characterize TDD systems. In one fleeting reference within that document, the Coalition inartfully referred to the portion of time in which a given device transmits as a "frame".[2] However, as the discussion of duty cycle in this proceeding has been refined over the past year, the term "frame" has come to refer to the complete cycle of a base station transmissions, guard time, mobile transmissions and guard time. As the Coalition has subsequently made clear, most notably with the March 31, 2010 submission of a white paper by TeleWorld Solutions, in a WiMAX 802.16e system, a "frame" consists of four subframe elements (the base station transmission time, the transmit transition gap during which the system is silent, the mobile transmission time, and the receive transition gap during which the system is again silent) that total 5 milliseconds in length.[3] However, because a 5 millisecond frame for measuring the duty cycle is WiMAX 802.16e-specific, and other 4G standards utilize other frame rates, the WCS Coalition has suggested that to maintain technology-neutrality, any rules specify the duty cycle measurement duration as tied directly to the frame duration for the technology in use.[4]

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[1] *See* Comments of Sirius XM Radio Inc., IB Docket No. 95-91 and WT Docket No. 07-293, at 31 n. 80 (filed April 23, 2010).

[2] *See* Letter from Mary N. O'Connor, Counsel to WCS Coalition, to Marlene H. Dortch, FCC Secretary, IB Docket No. 95-91 and WT Docket No. 07-293, Exhibit B (filed Aug. 4, 2009)("In order to accurately represent the actual behavior of a two-way signal, SDARS should have modulated 5 ms followed by a 5 ms (or slightly more to accommodate guard time) off time followed by the next transmit frame.") (Copy attached.)

[3] *See* Letter from Paul J. Sinderbrand, Counsel to WCS Coalition, to Julius Knapp, Chief, FCC Office of Engineering and Technology, *et al,* IB Docket No. 95-91 and WT Docket No. 07-293 (filed Mar. 31, 2010)("WCS Coalition March 31, 2010 *Ex Parte* at 2-3"). *See also* Letter from Paul J. Sinderbrand, Counsel to WCS Coalition, to Marlene H. Dortch, FCC Secretary, IB Docket No. 95-91 and WT Docket No. 07-293, at 4 (filed Jan. 29, 2010).

[4] *See* Letter from Paul J. Sinderbrand, Counsel to WCS Coalition, to Marlene H. Dortch, FCC Secretary, IB Docket No. 95-91 and WT Docket No. 07-293, at 2 (filed March 15, 2010).

Requiring that mobile devices remain silent during their allocated transmit subframe every other frame would effectively preclude WCS systems from providing broadband service to the public as envisioned by the National Broadband Plan. Such a restriction would effectively cut in half uplink throughput capacity, depriving subscribers of adequate two-way speeds. The Sirius XM proposal would effectively reduce the duty cycle for a WiMAX system to 19% (measured over a 10 ms duration), and the WCS Coalition has previously demonstrated that the limited throughput permitted at such a duty cycle would disqualify WCS as a viable competitor in the marketplace.[5]

Moreover, even were that not the case, Sirius XM's proposal is not viable. It is not supported by any standard technology currently in existence. As the WCS Coalition has previously advised the Commission, uplink/downlink ratios are established at the network level, and current standards-based TDD systems do not allow for control of individual mobile devices in the manner that would be required to implement Sirius XM's proposal.[6] Moreover, it is unlikely that any standard would be developed that supports such a limitation because it would be inapplicable outside the U.S. In addition, requiring WCS mobiles to incorporate this capability will result in "one off" devices for the United States market that will be far more expensive than devices for other bands, assuming that any vendor is prepared to manufacture them in the first instance given that the devices will be of no interest outside the limited US market.

Finally, the WCS Coalition's tests last year in Ashburn, VA – the only tests conducted with an actual operating TDD system – demonstrated that harmful interference does not occur when mobiles transmit during the allocated transmit subframe of each and every frame.

[5] *See* WCS Coalition March 31, 2010 *Ex Parte* at 2-3.

[6] *See id.,* Exhibit B at 2.

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May 12, 2010

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Re: *Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band* (WT Docket No. 07-293) -- WRITTEN EX PARTE PRESENTATION

Dear Ms. Dortch:

Recently, the Aerospace and Flight Test Radio Coordinating Council ("AFTRCC") filed reply comments in connection with the April 2, 2010 *Public Notice* soliciting comment on draft technical and service rules developed by the Commission's staff to govern satellite Digital Audio Radio Service ("SDARS") terrestrial repeaters and 2.3 GHz band Wireless Communications Service ("WCS") facilities.[1] That filing evidences a fundamental misconception regarding the potential of WCS facilities that would be permitted under the *Technical Public Notice* to interfere with non-federal mobile aeronautical telemetry ("MAT") receivers. The WCS Coalition is taking this opportunity to set the record straight.[2]

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[1] *See* Commission Staff Requests That Interested Parties Supplement The Record On Draft Interference Rules For Wireless Communications Service And Satellite Digital Audio Radio Service, *Public Notice*, DA 10-592 (rel. Apr. 2, 2010) ("*Technical Public Notice*"). The *Technical Public Notice* did not provide for the filing of reply comments, and thus AFTRCC's filing is unauthorized. However, the WCS Coalition has no objection to consideration of that filing as a written *ex parte* communication.

[2] Although there is no need to address the issue in detail, AFTRCC criticizes the WCS Coalition for having not previously addressed AFTRCC's contention that testing conducted by AFTRCC in Ashburn, VA supports its conclusions. Reply Comments of Aerospace and Flight Test Radio Coordinating Council, WT Docket No. 07-293 *et al.*, at 2 (filed Apr. 30, 2010) ("AFTRCC Reply Comments"). As AFTRCC's technical consultant candidly concedes, the spectrum analyzer testing that he conducted on July 21, 2009 using the live WiMAX signal that the WCS Coalition transmitted at the test site "lacked the sensitivity and response times needed to capture key aspects of the interference environment." *See* Letter from William K. Keane, Counsel to AFTRCC, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 07-293 and IB Docket No. 95-91, Engineering Statement, at 1 (filed Aug. 14, 2009). Rather, the AFTRCC testing was conducted utilizing only a signal generated by Sirius XM Radio Inc. ("Sirius XM) under a test scenario that the WCS Coalition has previously demonstrated "was not realistic and did not reflect how any practical two-way broadband system would operate on these frequencies." Letter from Mary N. O'Connor, Counsel to WCS Coalition, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 95-91 and WT Docket No. 07-293, at 2 (filed Aug. 4, 2009). *See also id.* at Exhibit B.

At the outset, the WCS Coalition must emphasize the importance of AFTRCC's concession that MAT interests have fully protected themselves from any possible overload interference by installing appropriate filtering at MAT facilities.[3] Thus, the question of whether the staff's proposed rule changes will have any adverse impact on MAT is simplified, and revolves around one question – will regulating WCS base stations power levels by average power, rather than peak power, result in any material increase in out-of-band emissions ("OOBE") within the MAT band?[4] The answer is NO!

For some time, AFTCC has been urging the Commission to continue evaluating compliance with the WCS power limits by limiting peak power, rather than by limiting average power subject to a maximum 13 dB peak-to-average ratio ("PAR"). The staff's proposal rejects AFTRCC's position. That is not surprising given the Commission's recognition that using peak levels to measure power imposes a regulatory bias against wideband technologies that employ non-constant envelopes, such as WiMAX and LTE. As the Commission concluded in establishing power limits for the 700 MHz band based on average power:

> [a]lthough the use of "average" power will effectively result in an increase in 700 MHz Band power levels for non-constant envelope technologies, such as CDMA and WCDMA, the "average" measurement approach is a more accurate measure of the interference potential for these technologies. We find that any effective increase in power that would result through the use of an "average" measurement approach will be modest, and in any event will be outweighed by the benefit of measuring today's technologies using a more realistic and appropriate technique.[5]

AFTRCC would have the Commission believe that measuring maximum in-band power levels for WCS using average power, subject to a 13 dB PAR, will result in a substantial increase

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[3] AFTRCC Reply Comments., Engineering Statement at 2 ("[F]iltering at AMT sites solves the problem of 'overload' interference . . .."]. *See also id.* at 4 ("[I]n the case of overload interference, the potential victim can take effective action to protect its facilities by the installation of filters at the AMT dish. Such protection is widely used at AMT ground stations."); *id.* Engineering Statement at 2 ("AMT telemetry receivers cost tens of thousands of dollars and have outstanding intermediate frequency filters (i.e., high-order brickwall filters).").

[4] Because mobile devices do not utilize antennas with any material gain, the predominant source of potential OOBE interference is the WCS base station, not the mobile device, because the OOBE emitted from the base station antenna is increased by the gain in the WCS base station antenna.

[5] Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, *Report and Order and Further Notice of Proposed Rulemaking*, 22 FCC Rcd 8064, 8103 (2007). AFTRCC attempts to excuse MAT's existing vulnerability to OOBE interference under the rules that have been in place since 1997 by contending that "without a rule change to convert peak power to average power, WCS devices are unable to comply with the existing rules." AFTRCC Reply Comments, Engineering Statement at 2. That is patently not true. Adoption of the staff's proposal to permit measurement of power using average levels is not a prerequisite to WCS deployments – indeed, WCS licensees have deployed a wide variety of point-to-point and fixed point-to-multipoint systems under the current rules, limiting transmitter power to 2000 watts peak EIRP.

in OOBE WCS licensees will place in the 2360-2395 MHz band. However, that is not correct – the amount of attenuation must be increased as the power level increases, such that the maximum strength of the signal WCS can emit into the MAT band remains constant, no matter the in-band power level of the WCS signal.

The flaw in AFTRCC's analysis is perhaps best seen by comparing the OOBE that a WCS base station transmitter can emit into the MAT band under the current rules, against those that would be permitted under the staff's proposal. Section 27.53(a)(3) of the Commission's Rules currently requires WCS licensees engaged in fixed or mobile operations to attenuate their OOBE into the 2360-2370 MHz band by at least 43 + 10 log (p), which means that emissions of no greater than an absolute value of -13 dBm are permitted in the 2360-2370 MHz band. That same rules requires WCS licensees to attenuate their OOBE above 2370 MHz by at least 70 + 10 log (p), which limits emissions to no greater than -40 dBm above 2370 MHz.[6] These requirements were adopted in 1996 in General Docket No. 96-228, a proceeding in which AFTRCC participated extensively.[7] AFTRCC did not petition for reconsideration the adoption of these OOBE limits or otherwise indicate that its telemetry constituents would be unable to withstand the OOBE that WCS was permitted to create under the new rules.

If the staff's proposal to regulate WCS power by average levels is adopted, and WCS base station transmitters are permitted to operate at 2000 watts average EIRP, there would be no increase at all in the emissions into the MAT band. Emissions still would not be permitted to exceed an absolute value of -13 dBm within the 2360-2370 MHz band or exceed -40 dBm above 2370 MHz (the equivalent of 70+10log(p) attenuation).[8] Although AFTRCC's argument is far from clear, it appears to fear that there will be up to an additional 13 dB of OOBE into its band during the 0.1% of the time the proposed rule permits the maximum signal level permitted under the 13 dB maximum PAR.[9] The WCS Coalition's understanding is that during the transmitter type acceptance process, the Commission assures that even when operating at the maximum authorized peak power, the transmitter meets the OOBE requirements.

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[6] *See* 47 C.F.R. § 27.53(a)(3).

[7] *See* Comments of Aerospace and Flight Test Radio Coordinating Council, GN Docket No. 96-228 (filed Dec. 4, 1996); Reply Comments of Aerospace and Flight Test Radio Coordinating Council, GN Docket No. 96-228 (filed Dec. 16, 2006).

[8] To simplify this discussion, it is assumed that the OOBE limits at 2360-2370 MHz and above 2370 MHz remain constant under the new rules. In an earlier filing, the WCS Coalition has indicted its willingness to accept more restrictive OOBE limits above 2360 MHz in exchange for OOBE relief below 2305 MHz. However, whether that approach is adopted or not the point remains the same – the amount of emissions into the MAT band will not increase as a result of the change from peak to average measurement techniques.

[9] *See* Comments of Aerospace and Flight Test Radio Coordinating Council, WT Docket No. 07-293 *et al.*, Engineering Statement at 1-2 (filed Apr. 23, 2010).

Indeed, because the staff has proposed, and the WCS Coalition is prepared to accept, even tighter restrictions on OOBE into the MAT band than are currently in place, adoption of the staff proposal will result in less OOBE emissions from base station transmitters into the MAT band, not more. That is illustrated by the following table:

MAT BAND	PERMISSIBLE OOBE UNDER CURRENT RULE	PERMISSIBLE OOBE UNDER STAFF PROPOSAL	IMPROVEMENT
2360-2362.5 MHz	-13 dBm	-13 dBm	--
2362.5-2365 MHz	-13 dBm	-25 dBm	+12 dBm
2365-2367.5 MHz	-13dBm	-40 dBm	+27 dBm
2367.5-2370 MHz	-13dBm	-42 dBm	+29 dBm
Above 2370 MHz	-40 dBm	-45 dBm	+5 dBm

Simply put, AFTRCC fears of OOBE interference are misplaced. The Commission's process for approval of transmitters assures that base stations deployed by WCS licensees will meet the applicable OOBE limits 100% of the time, regardless of how high a maximum PAR is permitted and regardless of how often the Commission's rules permit the transmitter to operate at maximum PAR. *Adoption of the staff's proposal will result in less, not more, OOBE in the MAT band than is currently allowed.*

This leaves the Commission with quite the elephant in the room. Since AFTRCC has conceded that WCS in-band power is not its problem, and since OOBE into 2360 MHz and above will be improved, why is the Commission contemplating the creation of massive coordination zones that jeopardize the ability of WCS licensees to quickly deploy wireless broadband systems? Given the importance AFTRCC ascribes to MAT operations and the vigor with which it has participated in this proceeding, it defies credulity to suggest that AFTRCC meekly accepted inadequate protection in 1997 when the current WCS rules were adopted and waited more than a decade, until WCS sought to change rules totally unrelated to MAT, to raise its concerns.

If the Commission ultimately concludes it got MAT protection wrong in 1997 when it adopted the current WCS rules, and got it wrong again in 2002 when it created a WCS-like service in the 2385-2390 MHz band that afforded MAT even less protection than WCS, then the Commission should acknowledge that the need for additional MAT protection has nothing to do with the proposed changes in WCS power and OOBE rules. And, the Commission should adopt rules that fairly divide the responsibility for promoting WCS/MAT coexistence among the parties, rather than adopt a one-sided approach that puts the onus solely on WCS.

Respectfully submitted,

/s/ Paul J. Sinderbrand

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Counsel to the WCS Coalition

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August 4, 2009

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Re: *Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band* (WT Docket No. 07-293) and *Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band* (IB Docket No. 95-91)

NOTICE OF ORAL EX PARTE PRESENTATION

Dear Ms. Dortch:

On July 28-29, 2009 in Ashburn, Virginia, the WCS Coalition presented a demonstration that a fully operational Wireless Communications Service ("WCS") system will not cause harmful interference to satellite Digital Audio Radio Service ("SDARS") to representatives from the Office of Engineering and Technology, the Wireless Telecommunications Bureau, the International Bureau, Sirius XM and interested members of the public. As discussed in more detail in Attachment A, the demonstration by the WCS Coalition validated that the Commission can modify the Part 27 WCS rules as proposed by the WCS Coalition without fear of widespread interference to SDARS.[1] The results of this demonstration – the only study of potential interference from an operating WCS system – establish that if the rules the WCS Coalition has proposed are adopted, interference to SDARS is threatened in only the most rare of circumstances. In fact, in all of the scenarios presented during the live system testing (including scenarios added at the request of Sirius XM), there was no muting of the SDARS receiver at all, save for one brief mute in a single isolated instance that is highly unlikely to occur with frequency under real world operating conditions.

In addition, Sirius XM repeated an earlier demonstration in which it purported to demonstrate interference from WCS to SDARS and conducted additional static testing. This replication of the demonstration it previously conducted in Princeton, NJ and circulated to the

[1] Attachment A includes a matrix of the demonstrations proposed to be run by the WCS Coalition. However, in an effort to more efficiently utilize the time allocated, Commission staff requested that certain of the proposed demonstrations not be conducted because, given the results of earlier tests, interference was not likely to occur.

Commission via an edited video suffered the same flaws that the WCS Coalition has previously pointed out on the record -- the test scenario employed by Sirius XM was not realistic and did not reflect how any practical two-way broadband system would operate on these frequencies. Attachment B provides a full discussion of the flaws in the Sirius XM presentation. Perhaps most significantly, Sirius XM set the WCS signal generator it used as a proxy for an actual WCS system to operate a full 5 MHz WiMAX carrier in the D block channel right up against the SDARS band edge, which produced more muting than was demonstrated in the WCS Coalition's drive tests of the C and D block. After the Commission staff requested that Sirius XM move the center frequency of the WiMAX carrier 2 MHz away from the SDARS band edge to more accurately reflect the WCS Coalition proposal, the Sirius XM testing showed very little muting of the satellite signal. Through these demonstrations, it has become abundantly clear that the risk of out-of-band emissions interference from a WCS mobile device into an SDARS receiver will only occur under artificial conditions crafted for the purpose of showing worst-case scenarios. It would be unrealistic to expect an operational WCS two-way broadband system to operate a full 5 MHz carrier in the C or D blocks because the filter required to meet the OOBE limits is far too large to put in a mobile device.

The Commission has before it a draft *Report and Order* that will finally permit practical use of the WCS spectrum to meet the growing demand for mobile two-way broadband use. The successful demonstration presented by the WCS Coalition in Ashburn should eliminate any doubts that adoption of new Part 27 rules to permit flexible use of the WCS band in a technology neutral manner is long overdue.

Pursuant to Sections 1.1206(b)(2) and 1.49(f) of the Commission's Rules, this letter is being filed electronically with the Commission via the Electronic Comment Filing System. Should you have any questions regarding this presentation, please contact the undersigned.

Respectfully submitted,

/s/ Mary N. O'Connor

Mary N. O'Connor

Counsel to the WCS Coalition

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Jim Schlichting
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Exhibit A

WCS-SDARS COEXISTENCE FIELD DEMONSTRATION

A WCS-SDARS co-existence demonstration environment was developed in Ashburn, VA near Dulles International Airport. The area consists largely of modern commercial and office park developments with buildings ranging in height from one to five stories and is characterized as an open area with rolling terrain, wide streets, and moderate foliage. A survey of SDARS network coverage suggests that both Sirius and XM have suitable satellite coverage in the area. XM also appears to have some weak, intermittent terrestrial repeater coverage around the area, but none was noted within the drive test route. The WCS demonstration used commercialized equipment and the system was carrying actual two-way data traffic, and the test configuration was set up as a "real world" simulation.

The WCS test network consisted of a WiMAX base station and a commercial WiMAX end user device. The base station and commercial mobile device were provided by Alvarion Ltd. and are certified to comply with ETSI and WiMax Forum specifications.

The SDARS subscriber equipment was comprised of newly purchased "after market" units and commercially-installed units in rental cars. The WCS end user device was comprised of the WCS PCMCIA modem connected to a laptop and was situated in a separate rental car.

Software applications were used to generate traffic to send over the WCS airlink connection and to record the real time operating characteristics – output power, position, etc. – of the WCS subscriber terminal. The traffic profiles and drive route were selected to ensure that the WCS end user device operates over a full range of possible transmit power levels and activity profiles.

The demonstration was conducted using two test vehicles: one outfitted with SDARS subscriber equipment and one with the WCS end user device operating at power levels up to +24 dBm average EIRP. Data was collected while these test vehicles drove along a prescribed route. iPerf was used to generate traffic to send over the WCS airlink connection and the Alvarion software diagnostic tools were used to record the real time operating characteristics – output power, position, etc. – of the WCS subscriber terminal.

As set forth in the test matrix below several different demonstration cases, which include various permutations of the WCS device, WCS bands of operation, SDARS service, SDARS coverage condition, and traffic application were performed. As expected, the demonstrations overwhelmingly provided evidence of the effectiveness of reduced maximum power levels, overly restrictive OOBE limits, transmit power control and other "real world" parameters on coexistence of the WCS and SDARS operations and resulted in an interference free environment of the SDARS service.

The test matrix sets forth all of the planned demonstrations, while only those highlighted were actually performed due to the consensus that such additional tests would not show any interference into the SDARS service.

WCS-SDARS Demonstration
Test Matrix
July 28-29, 2009
Ashburn, VA

		SDARS Service		SDARS Device		Application Type			Positioning of WCS Device			WCS Device Tx Power		Results
Test #	WCS Frequency Block	Sirius	XM	OEM	After-Market	High Bandwidth Upload	High Bandwidth Download	VoIP	Lap Height	Ear Height	Dashboard Height	Fixed EIRP +24 dBm	Variable EIRP with TPC	
1	A-Block (Upper)	X		X		X			X			X		No muting
2		X			X			X		X		X		No muting
3			X		X	X			X			X		
4			X		X			X		X			X	
5			X		X		X				X	X		
6			X	X			X				X	X		
7			X	X		X			X				X	
8			X	X				X		X		X		
9	B-Block (Lower)		X	X				X		X		X		
10			X		X		X				X	X		
11		X			X	X			X			X		No muting
12		X			X			X		X			X	
13		X			X		X				X	X		
14		X		X		X			X				X	
15		X		X			X				X	X		
16		X		X				X		X		X		
17	D/A-Block	X			X		X				X	X		
18		X		X				X		X		X		
19			X		X		X				X	X		
20			X		X	X			X				X	No muting
21			X		X			X		X		X		
22			X	X		X			X				X	One short mute
23			X	X			X				X	X		
24			X	X				X		X			X	No muting
25	B/C-Block		X		X		X				X	X		
26			X	X				X		X		X		
27		X			X			X		X		X		
28		X			X		X				X	X		
29		X			X	X			X				X	No muting
30		X		X				X		X			X	
31		X		X		X			X			X		No muting
32		X		X			X				X		X	

In addition to the demonstrations set forth above, the WCS Coalition performed two additional demonstrations at the request of the FCC and Sirius XM respectively. The first was a demonstration that put the WCS enabled laptop on top of the SDARS vehicle about 1 ½ feet from the SDARS antenna operating at a fixed +23 dBm in the Lower B block. During WCS VoIP operations there was no muting, during a high bandwidth download there was slight muting and during a high bandwidth upload the SDARS signal was muted. This is not surprising given the unrealistically close proximity of the two devices. The second demonstration performed at the request of the Sirius XM was the same test as test number 22 on the matrix with the high bandwidth upload, except this demonstration was performed while the laptop was on the dashboard of the WCS vehicle, and once again there was no muting of the satellite signal.

Exhibit B

SIRIUS XM DEMONSTRATION

Sirius XM intended to replicate the Princeton, NJ drive tests that had been circulated via video, and to show some static tests focusing on the RF parameters of the generated signals. In addition, Sirius XM performed lab tests to allow measurements of the amount of overload power and OOBE required to mute its receiver. Below is a diagram that sets forth the Sirius XM test setup. The test set-up was not a true replica of any WCS technology currently available and did not use waveforms that were consistent with the operation of a realistic two way network.

All of the equipment including the signal generator, the noise generator, the power combiner, the power amplifier and the transmit filter that would be used to generate a signal, were stacked inside the trunk of one of the test vehicles attached to a vertically polarized dipole antenna intended to replicate a WCS user station. The Sirius XM tests were performed on the full C (2310-2315 MHz) block and the full D (2345-2350 MHz) block with the "WCS" vehicle stationary while the vehicle with the SDARS radio operating slowly pulled away from the WCS vehicle. The SDARS vehicle pulled away until a signal was reestablished anywhere in the range of 10-20 meters. This test-set-up was intended to replicate the worst-case scenario that is possible under what Sirius XM understood to be the proposed new rules, not a realistic depiction of any telecommunications service. Additional tests were performed where the test vehicles were parked within 3 meters of each other with a flat mask and only OOBE tested and there was no muting of the SDARS signal at all.

While the Sirius XM tests were performed in the full C and D blocks, what was demonstrated did not represent was the true impact of a TDD network on their receivers. In an operating system you have a transmission followed by guard time, followed by a reception followed by guard time and then it is repeated as necessary. In order to accurately represent the actual behavior of a two-way signal, SDARS should have modulated 5 ms followed by a 5 ms (or slightly more to accommodate guard time) off time followed by the next transmit frame. SDARS did not do this, but rather just burst the channel (or some subset of tones) 6, 12, or 25 % of the time. It appears that the Sirius XM showed nothing more than the effect of average power density, based on a duty cycle of a transient waveform. If done properly (modulated 5 ms followed by a 5 ms dead time) then the test would have been a more accurate representation of the operation of a mobile device.

In addition, the equipment utilized by Sirius XM to generate a signal in the full C and D block was contrived at best because the filter required is far too large to put in a mobile device and the effect of the filter on the waveform generated would not allow recovery of all the data in the system.

Further tests were performed by moving the WCS signal away from the SDARS band-edge in an attempt to more closely reflect a two-way operational system. Once the signal was adjusted by 2 MHz away from the SDARS band edge, the muting of the SDARS signal was minimal and the results corroborated the results of the positive WCS demonstration performed the day before.

Operation of WCS spectrum pursuant to the rules proposed by the WCS Coalition will not cause any significant interference to the SDARS signal. As is evidenced by these demonstrations, and as the WCS Coalition has been saying for some time, it would take the sun, the moon and the stars aligning just right for a WCS mobile device to cause interference to the SDARS receiver.

Interference from the WCS mobile to the SDARS receiver requires so many variables to be in place simultaneously that the likelihood of it ever occurring approaches zero. Are WCS device and SDARS receiver in close proximity? Is WCS device transmitting? Is the SDARS device receiving? At what power is WCS device transmitting? Are there obstructions between transmitter and receiver? Do WCS antenna and SDARS antenna have high degree of mutual coupling? Are both devices stationary? What frequency block is WCS transmitting on? What service is the SDARS receiver subscribed to? Is SDARS receiver served by terrestrial repeater? As was demonstrated in these tests, if all of these issues do not align in the worst-case for the SDARS receiver, a WCS mobile device will have no effect on the product the SDARS consumer is listening to.

Radiated WCS Test Setup